CLAIMS

1. An isolated nucleic acid molecule encoding a bacterial autoinducer inactivation protein.

2. The molecule of claim 1, wherein the nucleic acid molecule is selected from the group consisting of:

a) a nucleic acid having the sequence of the coding portion of SEQ ID NO:1;

b) a nucleic acid encoding the amino acid sequence of SEQ ID NO:2; and

c) a nucleic acid that hybridizes to a) or b) above, wherein a positive hybridization signal is observed after washing with 1 X SSC and 0.1% SDS at 55°C for one hour.

3. The molecule of claim 1, which further comprises a signal peptide coding region of any sequence.

4. An expression vector which comprises the nucleic acid molecule of claim 1, wherein the expression vector propogates in a procaryotic or eucaryotic cell.

5. A cell of a procaryote or eucaryote transformed or transfected with the expression vector of claim 4.

6. An isolated protein which has bacterial autoinduction inactivation activity, where the protein comprises the amino acid sequence of SEQ ID NO: 2.

7. A method for increasing disease resistance in a plant or animal, which method comprises introducing

into a cell of such plant or animal a nucleic acid sequence which encodes a bacterial autoinducer inactivation protein in a manner which allows said cell to express said nucleic acid sequence.

8. The method of claim 7, wherein the nucleic acid sequence is selected from the group consisting of:

a) a nucleic acid having the sequence of the coding portion of SEQ ID NO:1;

b) a nucleic acid encoding the amino acid sequence of SEQ ID NO:2.

9. The method of claim 7 or 8, wherein the nucleic acid sequence further comprises a signal peptide coding region of any sequence.

10. The method of claim 7 or 8, wherein the nucleic acid sequence further comprises a membrane attachment domain-coding region of any source.

11. The method of claim 7, wherein the plant is susceptible to bacterial soft rot disease.

12. The method of claim 11, wherein the plant is selected from the group consisting of potato, eggplant, Chinese cabbage, carrot and celery.

13. The method of claim 7, wherein the plant is susceptible to a bacterial disease in which the expression of a virulence gene is regulated by an N-acyl homoserine lactone autoinducer.

14. A method of preventing or reducing bacterial damage to a plant or animal, which method comprises

administering to a plant or animal in need of such prevention or reduction an effective amount of a bacterial autoinducer inactivation protein.

15. The method of claim 14, wherein the protein comprises SEQ ID NO: 2.

16. A composition for preventing or reducing bacterial damage to a plant or animal, which comprises:

a) an effective amount of a bacterial autoinducer inactivation protein; and

b) a suitable carrier.

17. The composition of claim 16, wherein the protein comprises SEQ ID NO: 2.

18. A method for screening of bacterial isolates for autoinducer inactivation activity, which comprises:

a) isolating a single colony bacterial culture from soil or plant samples;

b) screening the culture for autoinducer inactivation activity;

c) preparing a crude protein extract from the culture; and

d) confirming enzymatic inactivation of autoinducer activity by the crude protein extract.

19. A method of isolating the nucleic acid of claim 1 or claim 2, which comprises the steps of:

a) preparing a gene bank from a donor organism that contains a nucleic acid sequence coding for a protein with an autoinducer inactivation activity in a suitable host organism;

b) screening the clones of the gene bank; and

c) isolating the clones which contain a nucleic acid coding for a protein with autoinducer inactivation activity.

20. A process as claimed in claim 19, wherein *E. coli* is used as host organism.

21. A process as claimed in claim 19, wherein the steps of preparing a gene bank, screening the clones, and isolating the clones are performed in an *E. coli* strain that does not inactivate the autoinducer.

22. A method which comprises:

a) introducing the nucleic acid sequence of claim 1 or claim 2 into a bacterial cell; and

b) screening the bacterial cell obtained from step a) for changed biological function.

23. The method of claim 22, wherein the changed biological function is a function which is lost as a result of step a).

24. The method of claim 22, wherein the changed biological function is a function which is suppressed as a result of step a).

25. The method of claim 22, wherein the changed biological function is a function which is enhanced as a result of step a).